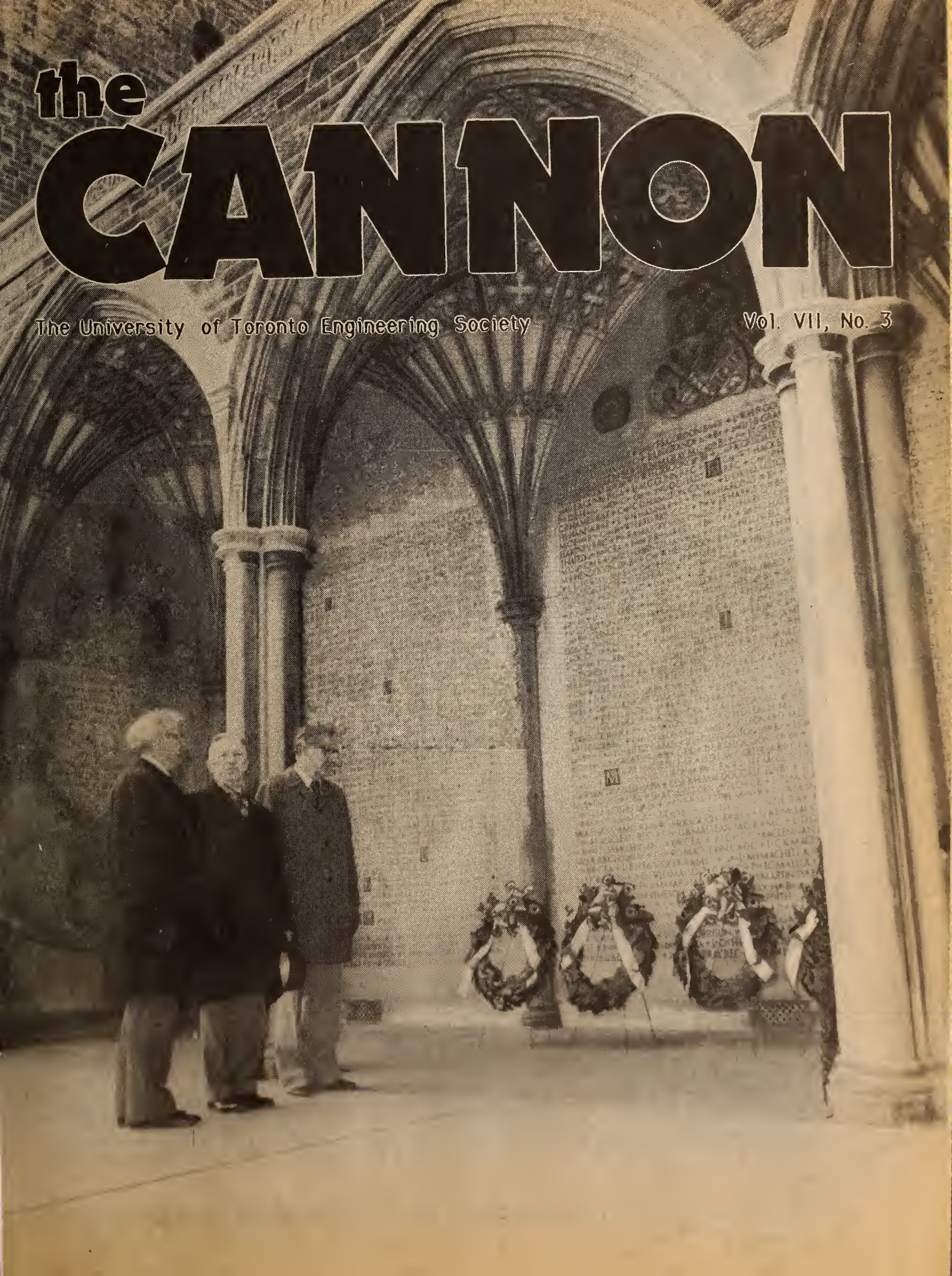


the

CANNON

The University of Toronto Engineering Society

Vol. VII, No. 3





Hear ye alle

the Centennial
and
Social
Committees

Present

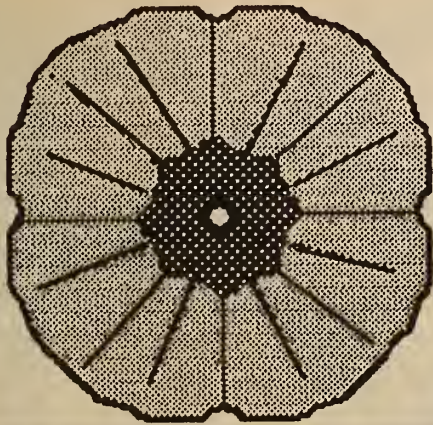
the
Centennial
Pub

Saturday, November 17, 8 pm
Wetmore Hall, New College

**Featuring a D.J. and a special
appearance by our Skule™ Stage
Band—famous for their noon hour
concerts.**

Come celebrate the end of Midburns!

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the

CANNON

U of T Engineering Society

Vol. VII, No. 3

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Centennial Trivia

Our trivia master, Barry Levine, is back with the answers to last month's quiz and this month's quiz.

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Fuelathon

Two members of U of T's S.A.E. club discuss their high mileage vehicle which attained 1000 m.p.g. this summer.

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Surface Science

The characteristics of surfaces are an important tool in Physics for verifying quantum mechanics theories. Here is a brief exposé on the subject and research tools.

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Skule™ is a registered trademark of the University of Toronto Engineering Society.

The Cannon is a publication of the University of Toronto Engineering Society. It is published monthly to announce Eng Soc events, discuss faculty and university matters, and present technical information of interest to Engineering undergraduates. Subscriptions are available, call Ella at 978-2917. Anyone interested in helping with *the Cannon* is most welcome.

The Cannon encourages submissions; please type or print legibly. Deadline for articles and letters for the next issue is Monday, November 26. Comments on *the Cannon* or articles appearing in it are appreciated. The editor reserves the right to edit for brevity. Not all opinions presented here are that of the Engineering Society.

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On the cover

Remembrance Day services by Soldiers' Tower, November 1979. Photo courtesy Robert Lansdale Ltd.

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Editor's Comments

November, the harbinger of winter, the deadline for major reports, the end of midterms, is particularly apt for recollection. It serves as a buffer between the rush and and anxiety of midterms and war. Indeed, sixty-six years ago it marked the end of a particularly bloody war, the first to see modern weapons and the devastation which they wreak. On November 11 we are asked to remember the men and women who died in order that others may live.

What are we asked to remember? The bloody bodies, the crowded trenches? I think not. We are asked to remember the reasons these people and their fellows who died in WWII and other battles of the twentieth century. Those who left voluntarily, died for their ideals and principles. It is hard for youths, for they always make up the vast majority of the front line soldiers, to be motivated by theories and statistics. They believed that their way of life was better.

We owe them a debt for, as the Americans say, they gave up their right to life for someone else's. What is the price? To be vigilant. To prevent such situations from ever occurring again. This does not mean totally scrapping our armed forces, nor does it mean that we should become armed to the teeth. Both idealogies are stupid, since most wars have started because both camps have existed. Instead we should look at the Swiss who stayed neutral and continue to stay that way. I am not advocating war, I am urging people to be aware of it and be wary of its formation.

We are among the brightest people in the country, we must be responsible for the people we serve. In a way we are like our cousins who died in the Great Wars, for we are sacraficing our ignorance for responsibility. This is why we are called *professional* engineers. We are responsible for and to the general public. This is why our professors drill us so mercilessly on

midterms and exams. We must be know our respective disciplines and be utterly certain in our judgement.

You may be bored with my preaching. If so, I urge you to look at the new standards to be a professional engineer. We are now recommended to carry liability insurance and to pass exams on ethics. Why? Because with the complex society that we have built, any breakdown can seriously endanger major portions of the population. Indeed, we now have the ability to wipe out as many people as were killed in the Great Wars. We have elected to carry this burden so we have to get used to it.

How? By being vigilant, aware of our surroundings, and our place in society. In this month of recollection and anticipation, let us remember both the dead soldiers and our engineering predecessors by trying to live up to their example. *Je me souviens.*



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Auditions

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17 2:00-5:00 pm

20 6:30-9:30 pm

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REMEMBER - You don't need talent - just enthusiasm.

Centennial Quiz

Barry Levine
SPS 8T4

As promised in the October issue of *The Cannon*, here is another installment of Engineering Society Centennial Trivia, followed by another quiz.

Margaret Seidel, of fourth year Geo-Engineering was the lone entrant and winner of last month's quiz. She was able to answer all but questions 6 and 10 correctly. Now, here are the answers to last month's quiz. The answers to questions 1 and 8 can be found by reading between the lines of last month's article and a bit of creative imagination. H.E.T. Haultain was Eng. Soc. prez during the year that the Engineering Library (later Supply Department and then Engineering Stores) was formed, so he can be credited with the founding of the Stores (option 'd' in question 1).

All of the options in question 2 were used at one time or another to describe Skule™ Nite, but option 'e', Ngynyrs in SPoSms, was the original name (see page 4 of the current *Skule™ Handbook and Calendar*).

In the 1975-76 academic year, the Skule™ Cannon was defaced, as described in the History of the Cannon (again see the *Handbook*). Prior to the protest using black hardhats, the Cannon Guard had worn red hardhats (option 'b'), which came into existence in 1963.

Questions 4 and 5 might have proven a bit tricky, but I'll bet that many of the faculty could give some insight into these (have you

ever tried talking to your profs?). The original auctions of School (before Skule™) were publicity events for the School Dinner (option 'a'). The funds raised at these real auctions (unlike those of recent years) were used to subsidize the Dinner. Although the first School dinner was held in 1890, it is doubtful that auctions were used from the outset. Often, items from other colleges or faculties were 'borrowed' to be auctioned back later (sort of like the SAC draft tap fiasco).

The two books published to help commemorate the Faculty's centennial in 1973 were *Cold Iron and Lady Godiva*, ('a'), and *The Next Hundred Years*, ('c'). *Cold Iron* is and has been on sale at the Engineering Stores for the lower-than-original price of \$7.50, and may prove helpful for future quizzes (hint, hint).

Question 6 is one of the questions that few are expected to know (have you ever written a perfect exam?), but Galbraith, Hollings and Haultain can be eliminated immediately. From this point you might as well guess (just like on exams, right?), unless you happen to know that T.R. Rosebrugh was vice-president in 1888-89. This leaves T.K. Thomson as the person listed in question 1 that was neither president nor vice-president of the Society. He was secretary from the time the Society formed in 1885 until the end of that academic year. In 1885-86, he was corresponding secretary.

The date of the Centennial Pub (question 7) can be found on the

84-85 *Calendar*. It is November 17 at Wetmore Hall, so be there!

Given the fact that John Galbraith was a prominent figurehead at the School of Practical Science, and seeing that he played a large role in the formation of the Society, the answer to question 8 should be relatively easy.

The theme for this year's CCES conference is 'The Role of the Engineer in Society' (84-85 *Handbook*, page 43).

Finally, question 10 was designed to stump you all (it did). The formation of the School Yell is surrounded by mystery, but it is known that the autumn of 1897 was the time. To this day, no one seems to know the meaning of the words 'Toike Oike'; it seems that the words may have been coined specifically for the Yell.

Before proceeding to the quiz, a bit of more history should be presented... The Brute Force Committee of today is a descendant of the early brute force committees used during elections of the U.C. Literary Society. Each party employed such committees to "screen" the constituents as they attempted to vote, allowing party faithfuls to proceed to the polls. Others were not let off so easily. By 1912, elections occupied an entire evening, beginning with the voting procedures and evolving into a social event:

...after the voting the participants would pile all the drafting tables in a corner of the first year drafting room. This mammoth room was located

on the third floor of the little red Schoolhouse. Everyone wore old clothes suitable for the celebrations, and indoor football, broomball, and chariot races ensued. In these early chariot races, each aspiring Ben Hur balanced himself on a thunder pot whose handle was threaded with tow-ropes... (Cold Iron and Lady Godiva, page 32)

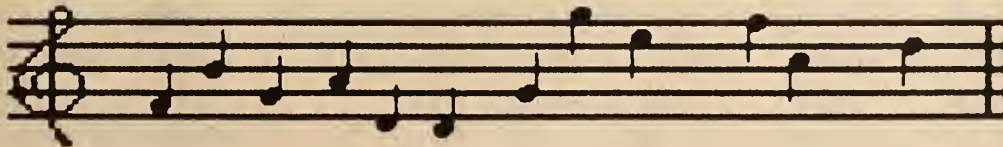
And finally, this month's quiz. In order to enter, submit your answers to the Centennial mailbox in the Engineering Society no later than 5 p.m. on Thursday, November 15. Don't forget to include your name and phone number. The prize will be two free admissions to the Centennial pub and two free beers each. The

winner will be announced at the SUDS pub on Friday, November 16. Let's see lots of entries this time 'round

1. Name the location of the early chariot races.
2. John Galbraith was Dean of the Faculty until his death. Dean Ellis succeeded him. What year did this occur?
3. What was one goal of the early Engineering Society?
4. What is the name of the first School song?
5. What is 'Ajax' and what role did it play in Engineering at U of T?
6. During the 1949 chariot races,

the Cannon was stolen. Who captured it, and on what date?

7. In 1954, a major disaster hit the Toronto area. Over 1,000 Skulemen™ offered their services in the clean up. In addition, \$1200 was collected from Engineering. What was the disaster?
8. In 1972, an electric vehicle was built for the Urban Vehicle Design Competition. What was the name of this vehicle?
9. In what year was The Cannon newspaper born?
10. When did the Engineering Society purchase its School Colours?



Noon Hour Concerts

Nov 14, at 12:30, the Sir Sandford Fleming Stage Band will play in the SF Atrium

Dec 7 at noon, our very own Skule™ Stage Band, accompanied by Malcolm McGrath on the organ, will play at the Annual Carol Concert in Convocation Hall.

All are cordially invited to both events

Eng Soc News

Faculty Teaching Award

On Saturday October 20, 1984 the first presentation of the new Faculty Teaching Award was made at the Alumni Awards Dinner. The recipient of this year's award was Professor D. James of the Mechanical Engineering Department.

The award was established by the Teaching Methods and Resources Committee in the hope that it will both reward and encourage a high degree of quality in teaching within the Faculty. The award is presented to a professor who has taught engineering classes for at least 3 years. Each departmental chairman nominates a professor from their area and then issued a folio of credentials to the selection committee. This six-man committee makes the final decision.

The award carries not only honour and distinction but also a \$1000 cash award for the winner.

This year's winner, Professor James, was chosen for his fine record in the Mechanical Engineering Department. I had the opportunity to talk with him and see what his reaction was to the award. He said that he was overwhelmed and felt that it was quite an accomplishment to be considered with some of the faculty's best professors let alone to be chosen as the winner. I also asked him what makes him a successful teacher. He attributed it to the fact that he takes his job seriously and most importantly, that he established a good, two-way communication with his

students. It is hoped that in the future this award will encourage and maintain quality and excellence throughout the Faculty.

Congratulations Professor James.

Jeremy Bateson

Women's Coffee Party

There will be a Coffee Hour, sponsored by the Women's Committee, held on Monday, November 12, 1984 at 5 p.m. in the Geo Common Room on the first floor of the Sandford Fleming Building, across from the computer room. Baked goodies and coffee will be served. If you have an interesting concoction which you would like to try out, bring it along and we'll try it out!!!

I would especially like to see a lot of first year women come out!!! If you have any novel, interesting, unique(!) ideas to share, drop a note in my mailbox in the Eng Soc. I'll appreciate it!!!

Heidi Herget

Open House Review

The Engineering Open House that was held on September 29th went off like a bang, and the organizers were estatic with the response they got from the public. And with good reason. Skule™ Days '84 had something of interest for everyone. Whether one knew very little of engineering and was simply curious, or whether one was in the process of learning about it, it was fascinating.

The exhibits were spread mainly over the Galbraith, Sandford Fleming, Mechanical, and Wallberg Buildings — arrows posted on the floors, walls, and doors ensured that no one got lost. The projects and exhibits ranged from computer designed rat mazes, demonstrations on how an artificial arm works, to how efficiency can be increased in an industrial operation. Many of the research labs were thrown open and the graduate students enthusiastically explained their various projects and experiments. Fourth year engineers who are working on their theses were there by their projects to display their talents as well.

A lot of time and hard work goes into organizing something like the Open House, and some may question its usefulness. The benefits from such an enterprise are many. The public gets a better idea of what engineering is all about and sees that it is very much a part of the society we live in. For people who are not yet sure what each branch of engineering does and who get awed by its size, Open House is a fun way of learning more.

Attendance this year was very encouraging — about six to eight thousand people dropped by, which is a fair increase over last year's figures. Skule™ Days '84 was once more a success, and the way things are going, it promises to get even better.

Sid Gopinath

SAC Review Committee

At the last full council meeting of the Engineering Society, a motion was passed to establish a special committee to review our involvement with SAC. This committee will be responsible for submitting a report outlining the pro's and con's of SAC and also some possible alternatives to SAC.

The first meeting of this committee will be on Monday, November 12th at 5:00 in the SF Atrium. All those who are interested in SAC are urged to attend.

Nick Iozzo
Greg Dow

Industrial Best Salespeople

During the two-week telethon in late September and early October, the students in Industrial Engineering showed their stuff by convincing nearly 200 alumni that they should match, at least, the student incidental fee of \$100 per year. On October 3rd, 18 students from Industrial placed calls to alumni from 6:30 to 9:00, after a supper of cheese, cold cuts, beer and wine. In the space of 2 1/2 hours, they raised \$3,185 in specified gifts for the Faculty and \$5,217, approximately, in unspecified gifts — a grand total of \$8,402. This will buy equipment for Skule™, and the Industrials are \$200 richer by winning the Alumni Association prize. (Wonder what they'll buy with it?)

The results from the other evenings follow:

Civil	13	\$7,626
Geo & MMS	18	7,305
Mechanical	10	3,290
Eng. Sci	9	5,091
Chemical	16	6,480
Electrical	8	3,723

The grand total for the two weeks was \$41,917, an increase of nearly \$14,000 over last year.

Besides the obvious result of such a telethon (the purchase of new equipment for the Faculty), the public relations angle is very important. We have over 20,000 alumni out there in the real world and it is a good thing to remind them that Skule™ still exists.

Comments from the students involved indicate that a good time was had by all, and hearty thanks are extended to them for their time and effort. If you missed this year, watch for an announcement in the first issue of *the Cannon*, September '86.

Malcolm McGrath

Boat Racing

The turn out for the boat races was poor. We had 3 men's teams and at one time, a total of 3 women out. Waterloo arrived late with 4 men's teams and 2 women's teams and not enough boat racing glasses. I forgot my Eng Soc keys at home and only one of my staff showed up. Sounds like a disaster, right? Wrong! A janitor provided the keys, some Waterloo guys bought some glasses from the Brunswick, and people were getting "spirited".

There were some discrepancies about judging spillage but they were cleared as the time trials

passed. (the two women's teams shocked the U of T'ers with their ability to drink). Down for the tournament were The Knights of "Chem"elot (Wat's reigning champs), Ladies of the Knights (reigning women's team, from the same class. What a class!!), the ever popular "Sys" Pistols, the A-team, another girls team, and, my favourite, The Frosh, formerly Brown Frosh, who have finally learned to pour beer and drink faster too!

We supplied the Whore Dogs, the Drinking Heads, and the Muffins, a first year Eng Sci team.

The results were:

- 1) Knights of "Chem"elot (W)
- 2) Muffins (T)
- 3) A-Team (W)
- 4) "Sys" Pistols (W)

and about 50 drunk people.

I'd like to thank Steve Bywater, Tom Lee, all the participants, and Derek Jubb for helping me clean up and then telling me on Monday that it was us who cleaned up on Saturday.

P. S. Hey Muffins, Friday Night at Suds be there.

Franco Minatel



Fuelathon

Jeff Yuill
Mech 8T5

Ronald Zingel
Mech 8T5

You are watching television one night when one of numerous commercials interrupts your favorite program. Before you have a chance to sprint to the kitchen for more munchies, however, something catches your eye. A sleek, white, bullet shaped vehicle scoots across the screen. You focus your attention to the commercial and learn that Shell Oil is advertising its commitment to higher gas mileage by displaying a high mileage vehicle. The car featured in the Shell commercial was partly designed at the University of Toronto by members of the S.A.E. Club (Society of Automotive Engineers Club) and achieved almost 1000 m.p.g. in competitions.

Last September, the S.A.E. Club

unveiled a very ambitious plan to build a high mileage vehicle using the leading edge of high technology. The car design made extensive use of Kevlar, a composite material used in many advanced aircraft. With the aid of S.A.C., the Engineering Alumni Association and outside industries such as deHavilland Aircraft, the vehicle's potential was quickly realized. Some manufacturing errors forced the vehicle to be withdrawn the night before the first competition. A structural crack had formed in the lower load-bearing frame. Due to the unique one piece construction of the Kevlar body, the error could only be corrected by total reconstruction.

The U. of T. engine had been modified substantially. Changes included increased compression ratio, decreased displacement and an overhead valve configuration. Because the U. of T. body was damaged, the engine was coupled with the Mohawk College chassis.

The Mohawk vehicle had a dismal showing of 350 m.p.g. in previous competitions. The main source of inefficiency in their vehicle was their engine. Using the U. of T. engine, the vehicle attained 1000 m.p.g.

This season, (1984-85) promises to be the club's best. Vehicle weight will be reduced further by increased usage of Kevlar and graphite composites. Greater engine efficiency will be obtained through the use of a microprocessor controlled fuel injection system. The aerodynamic drag of the vehicle body will be minimized through wind tunnel testing. Drivetrain efficiency and rolling resistance will be optimized by extensive testing.

Last year, the composite body constructed by the U. of T. weighed

continued on page 20



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Nov. 10

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UC

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ADMISSION: \$2.00

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Surface Science

James MacLean
Eng Sci 8T6

Surface Science?

Often when the study of solids is undertaken on an atomic level one considers the processes that take place deep inside the solid where every atom has neighbours on all sides. But many processes that interest us, such as the ejection of electrons from a metal by photons, the reflection and/or absorbance of an electromagnetic wave incident on a surface, or the transmission of surface phonons (quantized vibrational energy), are exclusive to surfaces and it becomes necessary to have some understanding of the physics of surfaces. The question then arises "What are the characteristic properties of a surface?" Surface science experiments are capable of yielding information on surface periodicity, atomic potentials, atomic energy levels, and magnetic properties of materials, to name a few. In this context the word surface implies the monolayer of atoms right at the boundary of a solid.

Since any atomic system can, in real life, be quite complicated, it is often useful to study surfaces which may have an ordered and possibly symmetric arrangement of atoms; for this reason the most studied materials tend to be relatively simple crystals such as NaCl or adsorbed, gaseous overlayers (this term will be explained later in this article). This article will attempt to take a brief look at some of the experiments that are done and the

conditions under which they are conducted.

Ultra-High Vacuum

Surface science experiments are typically carried out in a high vacuum (HV) or ultra-high vacuum (UHV) environment due to the fact that the experiments all involve particles such as electrons, light atoms (eg. H, He) and their ions: it is essential that there be virtually no other molecules or atoms in the chamber to obscure the processes at work. HV is defined as a working pressure between 10^{-8} and 10^{-10} Torr, while UHV implies a pressure of less than 10^{-10} Torr. To get a feeling for the magnitude of these pressures note that one atmosphere is 10^3 Torr — 10^{-11} Torr roughly corresponds to the atmospheric pressure that one would measure on the surface of the Moon.

The question that must now be answered is "How can such low pressures possibly be attained?" A conventional mechanical pump is quite inadequate for the job on its own, although precision versions are employed to "rough" pump a chamber down to about 10^{-3} Torr at which point one of a variety of more sophisticated pumps can take over. Three of the most popular pumps are oil diffusion pumps, cryopumps, and turbomolecular pumps. Oil diffusion pumps use a fine oil which is injected by jets into the chamber; the oil traps other molecules/atoms and drags them down out of the chamber. The major drawbacks of this style of pump is that it is large and

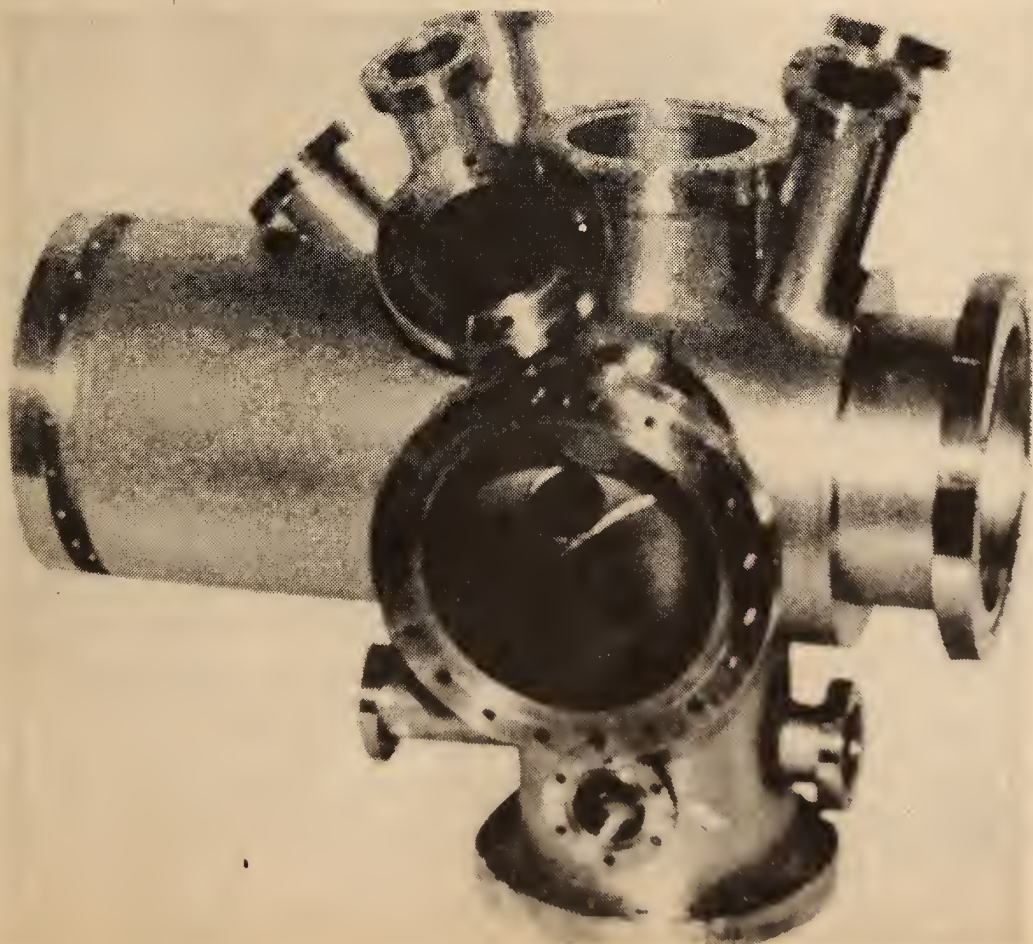
cumbersome, it must be vertical to operate, and the use of oil precludes an ultra-clean chamber. The last difficulty may be countered by the use of a liquid nitrogen baffle that prevents the spread of oil through the chamber while still allowing it to perform its function of evacuating the chamber. (It should be noted that it is still quite difficult to operate a clean UHV environment with oil diffusion pumps.) The second type of pump, the cryopump, works by adsorbing the molecules/atoms in the chamber onto a very cold surface: liquid nitrogen is commonly used as a coolant in cryopumps giving an effective surface temperature of about 77 K. Any particle entering the pump and striking the inner surfaces tends to become trapped there. As the pump has no easy way of removing the adsorbed molecules/atoms, at regular intervals (approx. every 600 hrs.) the pump has to be isolated from the UHV environment and warmed to expel the adsorbed particles. This leads to a costly disadvantage in that these pumps require isolation valves that often cost \$5 000 and up in U.S. funds. Also, if a cryopump should for some reason warm up without being vented, there is the potential for a dangerous explosion. The third frequently employed pump is the turbomolecular pump. It acts in a manner similar to a jet engine compressor; inside the pump are many circular turbines that rotate at very high speeds (this is especially easy in an environment that is at a pressure much less

than 10^{-8} Torr) catching and propelling particles out of the chamber. These pumps are not particularly efficient, however, at expelling light atoms such as H and He which are favorites among atomic beam experimentalists. There is also the ever-present danger of a turbine fracturing or a bearing seizing with the result being a "gutted" \$15 000 turbomolecular pump not to mention other extensive damage. These pumps must be capable of removing atoms that are injected into the chamber during the course of an experiment, such as an atomic beam diffraction experiment. This

often requires pumping speeds in excess of 2 000 L/sec! Upon considering the advantages and disadvantages of each style of pump, it is useful, for a given situation, to employ not one single type of pump but a combination of the available types. This lends a valuable flexibility to the options that are available when deciding how to solve the problem of evacuating an experimental chamber.

So far we have looked only at methods of creating an UHV environment and not at the chamber in which it is to be created. The chamber, in addition

to containing the sample under study, must also have viewing ports, laser ports, and ports to accommodate electron guns, electron energy analyzers, ion guns, mass spectrometers, etc. Some of these ports may also require rotatable flanges. Standard Viton "O" rings are not always suitable in UHV applications (they can evaporate thereby limiting the amount of vacuum attainable) and copper or stainless steel gaskets must be used. As many experiments, particularly those involving electrons, are sensitive to external magnetic fields, some



A Cylindrically Shaped Analytical Chamber

of these chambers must be magnetically shielded. This is most frequently achieved by manufacturing the chamber out of "mu-metal" — a metal with special magnetic shielding properties. The chambers often are reminiscent of something out of a science fiction movie. It should be mentioned that there are high quality experimental chambers presently being manufactured here in southern Ontario.

Surface science studies make use of some of the most advanced UHV technology now available in their experimental set-ups: the price tag is very high on this technology but, as we shall see later, the benefits derived are worth it.

The Experiments

There are presently many different types of surface oriented experiments being done in laboratories around the world: in all of these cases the experiments are sensitive only to the top monolayer of the material being studied. Inside the experimental chamber it is possible to "grow" a layer of atoms, such as Xenon, on a crystal substrate — under carefully controlled conditions it is possible to adsorb a layer exactly one atom thick which subsequently acts as a surface in its own right. In this manner it is possible to study atoms that would not normally present themselves in solid form. Some of the popular processes carried out on surfaces and overlayers are atom and electron diffraction, meta-stable de-excitation spectroscopy, and photo desorption of adsorbed

overlayers.

Surfaces and overlayers are often studied and characterized by electron and atom diffraction experiments. A beam of atoms or electrons can be collimated and made to impinge on a surface at a known angle: the velocity, and hence the de Broglie wavelength, of the particles are well known. The diffraction pattern formed by the reflected particles can then be recorded and used to discern properties of the surface such as surface periodicity and atomic potentials.

Another experiment which is presently being done is metastable de-excitation spectroscopy (MDS): in this process, a molecular beam of metastable atoms (such as He) is directed at the surface (either the surface of a solid or an adsorbed monolayer of gas such as Xenon). During the collision the atom drops from its excited state and frees an electron from the surface that has the excitation energy of the atom less the binding energy of the surface. The energy of the electron ejected is then measured and can yield much information about the surface. The advantage of MDS is that it removes electrons only from the top layer of atoms and hence mono-layer work may be done.

A third common process is that of photo desorption of adsorbed overlayers. Laser light can be used to desorb adsorbed overlayers on a surface. This may occur by one of two mechanisms: 1) heating of the substrate by the laser to excite and eject atoms (this occurs at all

frequencies and is a trivial result), or 2) by heating the overlayer to eject atoms. The latter takes place at only certain resonant frequencies and may be monitored by a mass spectrometer.

These are several of the many experiments that are presently being used to study the properties of surfaces. At present surface studies enjoy a good deal of research funding and as a result, new techniques are constantly being developed to enhance the state of the art.

Where does it lead?

The studies of surfaces is very alive in today's scientific community as is evidenced by the technology that has been developed for it and the funding that it has available. It may not, however, be obvious what the benefits derived from the study of surfaces are. The first use is the collection of data to aid in the development and verification of quantum theory: data may indicate the limits of the present theories and may even lead to the formulation of new and/or more advanced theories. There are also many instances in which monolayers are used in day to day applications of technology, for example coatings on lens optics or ultra thin layers of semi-conductor materials in integrated circuits. As is often the case, though, the physics of a system is often in study for a long time before the results are useful in a widespread manner. All that can be said is that surface studies appear capable of producing some very worthwhile results.

President's Message

October was one of those eventful months that come around every once in a while. First of all, congratulations and thanks are due to Franco Minatel, Ron Dižy, and the gang for upholding the honour of SKULE™ by making this year's Homecoming Float one of the best ever. Sadly however, in a completely unexpected maneuver, Erindale managed to build the proverbial 'better float' and came away with this year's trophy.

Oktoberfest went extremely well, and although attendance was down this year, most of those who did come felt that it was one of the best parties Engineering has ever put on. Thanks to Kim Harkness for organizing it.

Kim is also in the news this month because she is spearheading a movement within Faculty Council to have Orientation 85 made into a two day long event. It is generally felt that two days would better enable us to truly orient Frosh to Engineering and the university, and more effort could be put into getting involved with the other faculties and colleges, most of whom start classes at least a few days after us. Two days would also give both Frosh and upperclassmen a better chance to get prepared for classes and to buy books. The idea has already been approved at the committee level within Faculty Council and it is expected that it will also be approved by Faculty Council in general in November.

The OPEN HOUSE on September 29 was a big success. This year's attendance was the largest ever, and operations were smoothly run

so that most people got to see quite a few displays.

Two new committees have been formed within the Eng Soc over the past month. The first, *The Bylaw Review Committee*, chaired by our V.P.-Admin, Peter Kurpis, is to look into the status of the Eng Soc with respect to how the Eng Soc council is composed and operated. Goals for this committee include changing our Constitution and possibly altering the size and shape of the council itself. The second committee, *The SAC Review Committee* has been set up, with Nick Iozzo and Greg Dow as co-chairmen, with the mandate to look into our relationship with SAC and recommend any changes. This year SAC collected fourteen of your dollars. Next year it will be sixteen. Quite a few people have expressed concern with where SAC

is spending its/our money. You now have before you the opportunity to have input into the alteration of your two main representative bodies on the campus. I suggest that you use it.

My position as President means that I sit on the Council Of Presidents Of the U of T (COPOUT). Right now we are looking into the area of non-academic discipline at the university. In case you are wondering, non-academic discipline means suspending or expelling a student for crimes that are not of an academic nature, such as vandalism, or abusing the computer facilities. The power to act in this area now rests within the individual faculties and colleges and some of the other presidents, as well as SAC, would like to see a comprehensive code for the whole university.

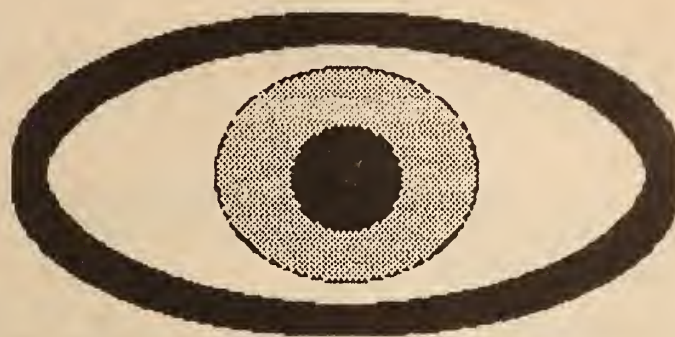


To finish off, I have finally found a purpose to my Presidency. Access U of T is the group responsible for making the university more accessible to the handicapped. At the top of their list of priorities is a ramp for the front of the Medical Sciences Building. Two-and-half years ago, they obtained an estimate for the cost of building a concrete ramp at about \$42,000 (1982). Since 1981, they have been able to raise about \$8,000 towards this ramp, so it looks like the ramp will never get built. Well it just so happens that we in engineering have both the technical expertise and the spirit to build such a ramp at a greatly reduced cost. At the same time, we are looking for a means with which to commemorate and publicize the centennial of the Engineering Society. It is for these two reasons that I have volunteered us to build the ramp as an official centennial project. Right now I have a small but enthusiastic team of fourth-year Civils working on the design of a ramp, and I have been in contact with both Physical Plant, to work out construction and approval details; and Access U of T to work out financial arrangements. If you have a desire to learn how to pour concrete or participate in a REAL engineering activity, get in touch with me at the Engineering Society soon.

In the meantime:

Scite et Strenue,
Skilfully and Vigourously,

William Hollings
President



Has your class entered the SCAVENGER HUNT?

sign up ends tomorrow at noon

Engineering Athletics

Betty Dolinar
EAA Publicity Director

Men's Athletics

Soccer

Both Div I and Div III soccer teams suffered slow starts this season. However, their stamina and skill has paid off. With the regular season almost completed, the Div I team has a 1-1-2 record, a record that has given them a second place standing in their division. The team is looking forward to a good bout in the playoff round. The Div III team also has an excellent chance of making the playoffs. Their performance has earned them an outstanding record thus far, with victories over Trinity, Pharmacy Grads, and Innis. Good luck to the

teams in the playoffs.

Rugby

The rugger team has experienced yet another successful season. Under the supervision of coach Glyn Jones, the team has a record of 3-2 and is currently tied with Scarborough for first place. The playoffs look bright for this team. Once again the Queen's Invitational Engineering Rugby Tournament was held and once again the U of T Engineering squad was victorious.

Tackle Football

Tackle football has been a major disappointment this year. What started as a large team has dwindled to a small number of dedicated players. Although regular practices are held, the team has suffered decisive losses

against teams representing the larger colleges on campus. With the budgets allotted to the PHE and SMC teams and the coaching staff available to them it is not surprising that the Mulock Cup is awarded year after year to these teams. Unfortunately, it is more the lack of spirit on the part of Engineering which has been the deterring factor this season. Skule™, where's your spirit of competition?

Lacrosse

The lacrosse team has also had its share of difficulties this season. They have experienced a series of losses although the point spread has been narrow. Better luck to the team next year.



Basketball

There are three basketball teams representing Engineering at the intramural level of play. The Div I team is composed of experienced players and already their expertise has paid off with two victories in the first two matches. The Div IIA team has enjoyed a similar success and should defend their championship title. However, the Div IIB team is off to a slow start suffering two losses in their first games.

Hockey

The Div IA squad will attempt to better its fourth place showing last year, fielding a stronger and more experienced squad this time out. The Div II team has also been selected. Both teams expect improved attendance and are optimistic about their performances this season. In the Intermediate level of play, 15 Engineering teams have been entered.

Volleyball

The volleyball season is just underway. Both a Div I and a Div II team have been entered and are expected to enjoy successful seasons.

Squash

Get into the swing of things by joining the men's squash team. The season starts next term, however the entry deadline is Thursday, November 15. There are 3 levels of competition. All those interested are asked to deposit their name and phone * in the Men's Athletics Director's mail box.

Women's Athletics

Flag Football

The most exciting of the women's sports this fall was flag football, not because I'm a member of the team, but because the team has enjoyed the best regular season play in the past four years. Their record of 4 and 2 earned them fourth place in the division and Intramural Team of the Week at the beginning of the season. Their success is owed to the experience of the team members and the coaching of Jim Mehi.

Soccer

The team that had always managed to make the playoffs in previous years encountered difficulties this season. The

competition in Div I was extremely stiff, so much so, that the team had trouble making the scoreboard. They ended the season with a 0-6 record. Better luck next year!

Innertube Waterpolo

This year's team was composed of players fairly new to the game. As a result, more time was spent learning how to manoeuvre in the innertube than chasing the opponent. The team won only one of its six games, however where skill was lacking enthusiasm prevailed. With many of the players returning next year, the team should be much improved.

Volleyball

As last year's Div II champions,



Teri Morrison, Geo 8T5, receives her Engineering Alumni Association Athlete of the Month Award from Malcolm McGrath

our competitive team will try their luck in Div I this year. The season begins this month and any women wanting to play in this league should contact Joyce Van de Vegte at 622-5053. Sign-up for the recreational Div III will continue for the remainder of this month as the season does not begin until January.

Hockey

The season is soon to begin with the completion of the Varsity Arena renovations. Last year's team made the playoffs and are again looking forward to a good season. New recruits are welcomed. Contact Dawn Demetrick at 537-1473.

Tournaments

Congratulations to Alumni 8T1,

winners of the second annual Engineering Touch Football Tournament. They defeated Mech 8T5 in the final match. The weather was perfect that day and attendance was overwhelming. A total of 27 teams participated and other than a minor delay, the schedule ran very smoothly. Most spirited team of the tournament was awarded to Metallurgy who seemed to have every student in the discipline out on the field, 35 students to be exact. Our thanks go out to all the participants who helped make the tournament a great success and to René Allen and Bruce Dow, its organizers, whose efforts are commended.

Congratulations also go out to Ind 8T7, winners of the Turkey Trot.

Although no more tournaments are scheduled for this term, keep

an eye out for announcements in the spring.

Coeds

Entry meetings for the following co-ed sports are to be held this month:

Badminton Team Doubles Tournament. Entry meeting: Wed., Nov. 14 5:30 pm, Board Room. To be held Fri. Nov. 23.

Basketball. Entry meeting: Mon., Nov. 19 12:00 noon, Board Room. Season begins Jan. 14.

For more details contact Joe Chiang at 223-4744.

Sign-up lists to watch for this month include men's water polo, and women's squash and badminton.

continued from page 10

ten pounds. The nearest competition had a car body weighing twice that amount. The great weight saving was due to the integration of the load-bearing frame and aerodynamic shell (monocoque construction). This technique is commonly used in all modern aircraft. The use of Kevlar further reduced the weight of the vehicle as it is ten times stronger than aluminum in tension. With a more complete stress analysis, this year's body may only weigh five pounds.

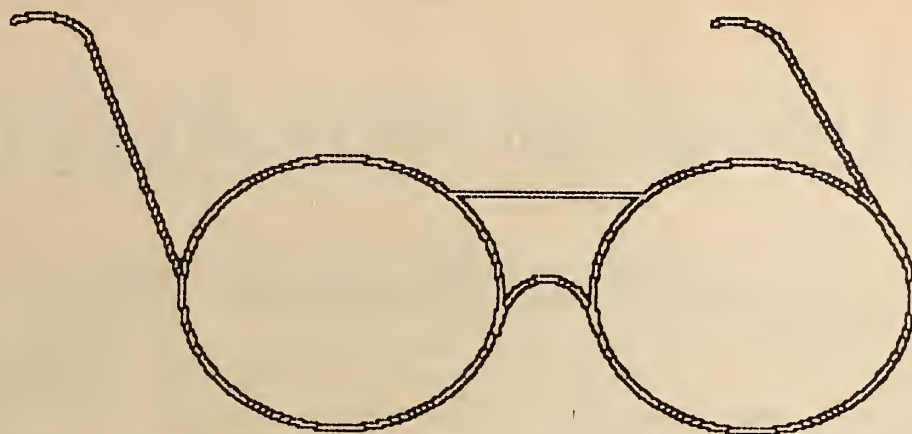
The engine that performed so well last year will be further

improved by a microprocessor controlled fuel injection system. The microprocessor will not only control the fuel-air mixture to maximize efficiency, but will also take over most of the functions that the driver previously performed. Now the driver will have only one task: steering the vehicle.

Several half scale models of the new vehicle will be tested in the wind tunnel to determine the optimum body profile. The minimization of aerodynamic drag will have to be coordinated with the practical limitations imposed by the driver's seating position and the attachment sites of mechanical components.

The new vehicle's potential cannot be realized without your help. Many critical components and assemblies must still be designed. Anyone (Frosh included) is welcome to join the team. This is one of the few student projects that can provide you with practical experience. For further information please see the notice board in the Mech Common Room (MC 331).

Special thanks to last year's sponsors: Dept. of Mechanical Engineering, S.A.C., Engineering Alumni Association, deHavilland Aircraft of Canada Ltd., Ciba Giegy Canada Ltd., Bay Mills Ltd., and Lansing Buildall.



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Letters to the Editor

Fellow students,

Oh, its midterm time again (and all of us are lucky just to get our assignments in on time!)...

For the Fourth Years, there's the added complication of securing permanent employment for next year, and, with fourteen years of relatively stable federal and provincial governments over, the job futures of young Ontarians is obscure. This is reflected in Eng. Sci. becoming a hybrid Electrical/Computer Engineering division, with a rare pioneer in chemical, aerospace, geophysics, nuclear, etc. It seems the only promising field of engineering R and D is high tech, what Northern Telecom calls the 'Information Universe' (indeed, most jobs at the Placement Centre are from this field)...

But, before such a decision as a future career is made, a closer look at the nature of this high tech explosion may be appropriate. As a member of Science for Peace, this soul was amazed to see the abundance of military contracts sustaining Canada's Silicon Valley. Yet, as Dr. Rapoport, professor of peace studies at U of T maintains, there is enough gadgetry on either side to finish off the Earth 100 times over. Why invent more? He says that today's scientists can't be blamed for wanting to pursue scientific research, but, often their work is deliberately distanced from its final use. He cites the example of a materials scientist in the U.S. who developed a chemical with greatly enhanced adhesive characteristics. It is now being used in the production of

Napalm, no longer allowing the flaming agent to be brushed off the skin...

We are engineers. We are scientists, trying to build a more beautiful, safer world, a world at peace, for our families, and the generations to come. For their sake, be careful where and how you apply your knowledge and ingenuity. Don't be afraid to hold fast to your sense of right and wrong. In this way, there will always be a springtime after every winter...

Yours in peace,

George Barnett
Eng Sci 8T5

Dear Editor,

During my research for the upcoming book commemorating the Engineering Society's centennial, I stumbled upon a copy of a letter which may be of interest to the Society. The letter is from T. Kennard Thomson, a graduate of the class of 1886 and the founder of the Engineering Society. This individual was involved in the formation of the original goals of the Society and remained active in the Society until his death.

At the time of the Society's 60th anniversary in 1944, Thomson wrote to the then-president of the Society, Bob Moore. I quote in part:

...As you know our Society was in full blast in March 1885

In those days any member who had paid 3 years dues (it should be 4 years now) automatically became a Life

Member. The Transactions of 1905 gives a list of about 200 Life Members....Have we, illegally, been kicked out, to make it an Undergraduate Society only?

From the start we invited all graduates and former students to become members and many did. ...

Some time after 1905 our Society had grown so, that the cost made it impossible to send Transactions free to Life Members, and since then I have sent \$1 a year for my set which is complete from No. 1 to date.

The reason I am giving these details now is because I am sorry to see our Society, the oldest Engineering Society in Canada, called an undergraduate society only, and would not like to think of my not being a member after 60 years, and am sure many others feel the same way....

Some food for thought.

Barry Levine, 8T4

Employment listings

On-Campus Recruitment

Graduate positions

Company Name	Deadline
Motorola	December 3
Johnson Controls	10
Fairchild Camera & Instruments	10
A. C. Nielsen Company	10

Summer Positions

Bell Northern Research	November 30
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Summer Listings

Company Name	Deadline
Ontario Geological Survey	NOVEMBER 12
National Research Council	19
Atomic Energy of Canada (Chaulk River)	30
NSERC positions	30
Pulp & Paper Research Institute	30

Calendar

DATE	EVENT	TIME	PLACE
NOVEMBER 8	Scavenger Hunt Sign-up	12:00	Ella's Office
9,10	Scavenger Hunt	9:00	North America
9,16,23,30	Skule™cycle meeting	15:00	WB 143
10	Frosh Pub	20:00	UC Refectory
12,19,26	Centennial Committee	17:00	WB 143
12	SAC Review Committee	17:00	SF Atrium
12	Women's Coffee Party	17:00	Geo Common room
13,14	Skule™ Nite Auditions—Band, Crew	18:30	SF Atrium
14	Sir Sanford Fleming Stage Band	12:30	SF Atrium
15	November Quiz return	17:00	Centennial Mailbox
15,20	Skule™ Nite Auditions—Cast, Crew	18:30	SF Atrium
17	Skule™ Nite Auditions—Cast, Crew	14:00	SF Atrium
17	Centennial Pub (Last Bash Before the Crash)	20:00	Wetmore Hall
20	Eng Soc Council Meeting	17:00	GB 202
24	Vanier Cup Football Game	13:00	Varsity Stadium
DECEMBER 3	Centennial Committee	17:00	WB 143
4	Eng Soc Executive Meeting	17:00	SF B740
7	Annual Carol Concert	12:00	Convocation Hall

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